

REMARKS

Claims 1-24 are now present in this application.

Claims 1, 2 and 12 have been amended, and claims 13-24 have been presented.

Reconsideration of the application, as amended, is respectfully requested.

Rejections under 35 USC 102(b) and 103

Claims 1, 8 and 11 stand rejected under 35 USC 102(b) as being anticipated by BACCHETTA et al., U.S. Patent 5,627,403. This rejection is respectfully traversed.

Claim 7 stands rejected under 35 USC 103 as being unpatentable over BACCHETTA. This rejection is respectfully traversed.

Claims 2, 3 and 10 stand rejected under 35 USC 103 as being unpatentable over BACCHETTA in view of HIGASHITANI et al., U.S. Patent 6,346,737. This rejection is respectfully traversed.

Claims 4-6 and 10 stand rejected under 35 USC 103 as being unpatentable over BACCHETTA in view of WOLF et al., Silicon Processing for the VLSI Era Volume I: Process Technology. This rejection is respectfully traversed.

Claim 9 stands rejected under 35 USC 103 as being unpatentable over BACCHETTA in view of SUNG, U.S. Patent 6,235,592. This rejection is respectfully traversed.

Claim 1

Claim 1 recites "forming a passivation structure over the plurality of metal interconnect structures, wherein the passivation structure comprises a first dielectric

layer and a silicon-oxy-nitride (SiO_xN_y) layer" (emphasis added). The first dielectric layer of claim 1 exhibits passivation function. The Examiner does not explicitly indicate which layer disclosed by Bacchetta et al.. is the first dielectric layer. Neither layer 4 nor layer 2 taught by Bacchetta et al. anticipate the first dielectric layer as claimed in claim 1. Layer 4 is a material with a low viscosity, used to locally planarize the upper surface, as is well known by the skilled in the art. Typically a SOG, a silane precursor in an organic liquid, is spun on to the entire surface, and then cured for gap fill. A partial etch-back of the SOG leaves it only in the deeper zones (shown as 4 in FIG. 2) (col. 5, lines 40-45). As such, the SOG layer 4 taught by Bacchetta et al. does not fully cover the surface of the interconnect structure and is not formed by HDPVD. It is respectfully submitted that the SOG layer 4 taught by Bacchetta et al. is a flowable material, which is only formed in the deeper zones, not on top of the structure 7.

On the other hand, the oxide adhesion layer 2 disclosed by Bacchetta et al. is formed over the portion of the first oxinitride layer not covered by the SOG, and over the residual SOG (col. 5, lines 45-47). The oxide adhesion layer 2 is disposed between the layers 1 and 3 and serves no specific passivation function. It should be thin, its thickness dimension being preferably on the order of a few tens of nanometer, specifically within the range of 5 to 50 nm (col. 4, lines 9-13). It is respectfully submitted that Bacchetta et al. teaches away from the present application because Bacchetta et al.. teaches an *oxide thin layer* 2 which serves no passivation function, and its thickness (5 to 50 nm) is not suitable for a passivation layer. As such, claim 1 is neither anticipated nor rendered obvious by Bacchetta et al.

Claims 2 and 3

Claim 2 recites that "the first dielectric layer is formed by depositing an HDP oxide over the plurality of metal interconnect structures with high density plasma chemical vapor deposition (HDPCVD)" (emphasis added). Preferably, the thickness of the HDP oxide is between 7000 to 10000Å (page 8, lines 12-17, claim 3). Bacchetta et al. does not teach or suggest that the first dielectric layer is formed by depositing an HDP oxide on the surface of the substantially planarized inter-layered dielectric layer with high density plasma chemical vapor deposition (HDPCVD).

Claim 23

Claim 23 recites "forming a substantially planarized inter-layered dielectric layer covering the plurality of metal interconnect structures" (emphasis added). The plurality of metal interconnect structures directly covered by the inter-layered dielectric layer is substantially planarized. The circuit structure 7 disclosed by Bacchetta et al. is directly covered by the inter-layered dielectric layer 1. It is respectfully submitted that the inter-layered dielectric layer 1 is conformal but not substantially planarized (emphasis added).

Claim 24

Claim 24 recites "the substantially planarized inter-layered dielectric layer is made of a hydrogen blocking material" (emphasis added). The substantially planarized

hydrogen blocking layer is disclosed in the specification (see page 7, for example, and tables 1 and 2). The hydrogen blocking layer associated with the passivation layer can provide decrease in charge loss, and also provide better suitability for data retention of memory units (see page 6, lines 5-7, for example).

Bacchetta et al. does not teach or suggest a substantially planarized hydrogen blocking layer over the surface of the semiconductor substrate covering the metal interconnect layer.

In view of the foregoing amendments and remarks, it is respectfully submitted that independent claim 1, as well as its dependent claims 2-11, 23 and 24, are neither taught nor suggested by the prior art utilized by the Examiner. Accordingly, reconsideration and withdrawal of the 35 USC 102(b) and 103 rejections are respectfully requested.

Allowable Subject Matter

Applicants gratefully acknowledge that the Examiner considers claim 12 to contain allowable subject matter. It is noted that this claim has been rewritten in independent form. Also, in view of the foregoing amendments and remarks, it is respectfully submitted that all claims should now be in condition for allowance.

Conclusion

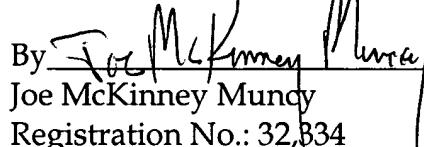
Favorable reconsideration and an early Notice of Allowance are earnestly solicited.

In the event that any outstanding matters remain in this application, the Examiner is invited to contact the undersigned at (703) 205-8000 in the Washington, D.C. area.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

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